PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in Pincers with Self-Adjusting Opening, Permitting of Quick Tightening

I, ERNEST MARTI, of Montécheroux, (Doubs) France, a Swiss citizen, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

Numerous types of tools are known, based on the pincer principle and intended to take hold of, tighten and move parts of variable thickness and limited by curved or plane surfaces, with their opposite surfaces parallel or not.

In all these tools the endeavor is made, by means of devices which are more or less complicated, to ensure that whatever may be the thickness of the part to be tightened (within the prescribed limits of each tool), the two jaws of the pincers shall, at the time of tightening, occupy as compared one with the other the most favorable position for firmly holding the part and effecting the movement it is desired to give it.

Among these types of tools, the multiple position pincers shown in Fig. 1 of the accompanying drawings are more particularly known. In these pincers the two jaws, A and B are, as is usual, connected by a pivot C, but one of them has, to take the pivot, not a single hole but a series of adjacent holes, forming an extended, continuous opening D, with grooved edges. Before tightening the pivot is placed in the groove for which, the two jaws being approximately parallel, the opening of the pincers is approximately equal to the size of the part to be tightened. The tightening stress fixes the pivot in the bottom of the groove.

The drawback of such a tool is that the pivot must first be adjusted in the proper position before the part can be tightened. Moreover, the number of positions of the pivot is necessarily very restricted by the size of the pincers and of the pivot itself.

These drawbacks are avoided in the pincers forming the subject-matter of this present invention, by the fact that the opening adjusts itself automatically and with the maximum of precision, by the tightening movement and merely by the fact that the tightening commences.

The essential characteristic of these pincers is that the jaw pivot, which is fixed on one of the jaws, can slide along a guide forming part of the other jaw, the outside edge of this jaw which is in front of the guide it comprises being provided with a toothed rack and the whole being of such dimensions that, whatever be the opening of the pincers, when the jaws, in relation one to the other, have the slant which is most favorable to tightening, a tooth on the jaw on which the pivot is fixed inserts itself automatically between two of the teeth of the toothed rack of the other jaw, which immobilises the pivot and brings the tightening movement into action.

If an article to be tightened is inserted between the two jaws of such a pair of pincers, it follows that to begin with the tightening movement only makes the pivot slide along its guide, until the jaws arrive at their relative position which is the most favorable to tightening, which brings about immobilisation of the pivot by the engagement of the tooth on the jaw on which the pivot is fixed with two of the teeth of the toothed rack with which the other jaw is provided. By continuing the tightening movement, the latter thereupon becomes effeective.

According to requirements, the guide along which the position of the pivot automatically adjusts itself can be straight or curved, just as the toothed rack on the outside edge of the same jaw can be. The relative position of the jaws which is most favorable to tightening also depends upon the use to be made of the pincers (more often than not, it is parallelism, but, according to the shape of the parts to be tightened, it can be angular).

Figures 2 to 4 of the accompanying drawings give a diagrammatic view of two examples of pincers in accordance with the invention.

In the example shown at Fig. 2 (position of the pincers when the tightening movement is commenced) and 3 (position when the tightening movement becomes effective), the pincers are shown tighten-

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ing a hexagonal part (nut, bolt head, etc.). 2 shows the branch of the pincers of which the jaw carries the pivot guide 3. This guide, which in the example shown is straight, is formed by the edge 4 of a slide 5. The toothed rack corresponding to this guide is also straight and is shown at 6. The other branch, 7, of the pincers, carries the pivot 3, and its jaw is provided with a tooth 8, opposite the toothed rack 6.

When the pincers are placed on the part I and the tightening movement is commenced by approaching the branches 2 and 7 one to the other, the branch 7 pivots round the supporting point 9 on the piece I, the pivot 3 slides in the guide 5 and this rotative movement causes the tooth 8 to engage between two teeth of the toothed rack 6 (Fig. 3), position for which the opposite surfaces of the two jaws are practically parallel (position which is here assumed to be the most favourable for tightening). The pivot 3 is thus fixed, and by continuing to approach the branches 2 and 7 one to the other, the tightening becomes effective.

A fairly large number of teeth—ten, for instance—can be arranged in the toothed rack 6, so that ten different positions can thus be arranged for the pivot, which confers great precision on the self-adjustment of the opening of the pincers.

It goes without saying that pincers in accordance with the invention can be provided with any and all devices intended to improve and facilitate their use or to make them suitable for specified uses (for example, for tightening tubes). Thus, the jaws can be provided with teeth in the direction in which they favor their adherence to the work piece, the ends of the jaws can have finer teeth in case small size parts should have to be tightened, the pincers in that event being used as an ordinary flat pair of pincers, etc.

In addition, the pivot can be provided with a device preventing it from sliding too easily along its guide. In the illustration given in Fig. 4, this device consists in a spring 10, supported on a washer 11 by the head 12 of the pivot 3, assumed to be screwed in the branch 7. In this way, if one and the same part has to be tightened successively several times—such as a nut—or if several parts of the same size have to be tightened successively, the pivot remains in the same position after the opening movement of the pincers.

Of course, the effect of the spring 10 (or of any equivalent device) is restricted to correspond to the purpose for which this spring is to be used, but which in any event remains insufficient to hamper the normal use of the pincers in any way.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A pair of pincers with self-adjusting opening, permitting of quick tightening, characterised by the fact that the jaw pivot, which is fixed on the first jaw, can slide along a guide forming part of the second jaw, the outside dege of the second jaw, which is in front of the guide it comprises, being provided with a toothed rack and the first jaw being provided with a tooth engaging said rack and the whole being made of such size that, whatever be the opening of the pincers, when its jaws have, one in relation to the other, the slant which is most favourable to tightening, a tooth on the first jaw on which the pivot is fixed automatically engages between two of the teeth of the toothed rack of the second jaw, which immobilises the pivot and actuates the tightening movement.

2. A pair of pincers, according to Claim 1, substantially as described with reference to the accompanying drawings.

Dated the 9th day of April, 1940.

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[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1

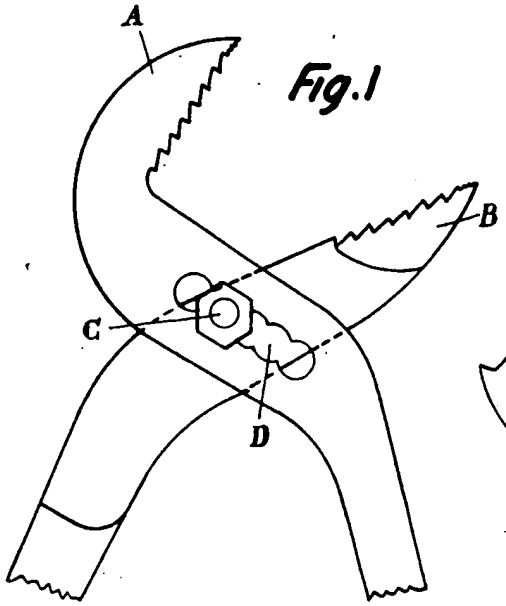


Fig. 4

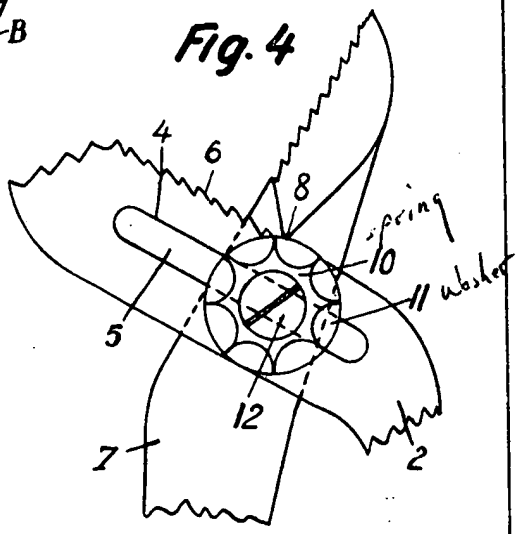


Fig. 3

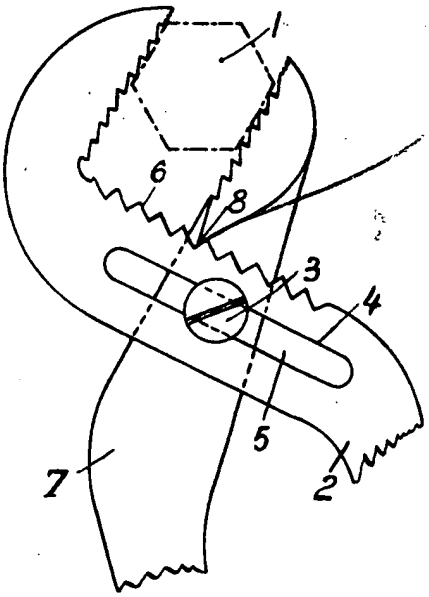
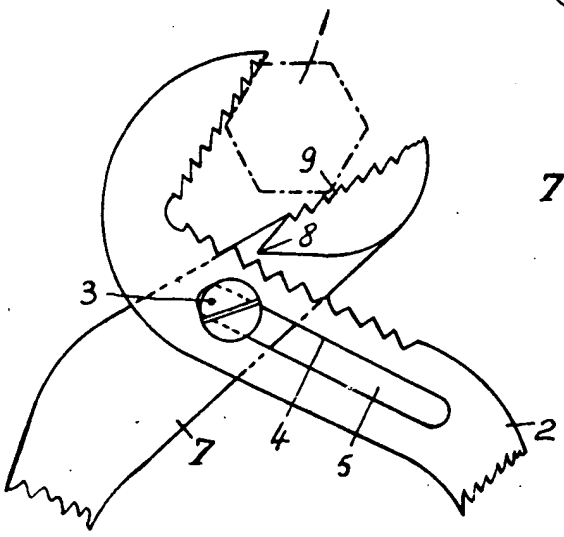


Fig. 2



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